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| EXAMINER | |
|---|---|
| CURS, NATHAN M | |

| ART UNIT | PAPER NUMBER |
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| 2613 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/643,017 | KISAKA ET AL. | |
| | Examiner | Art Unit | |
| | NATHAN M. CURS | 2613 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *29 January 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-61* is/are pending in the application.

4a) Of the above claim(s) *5-11,13,14,17-21 and 24-59* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,12,15,16,60 and 61* is/are rejected.

7)☒ Claim(s) *22 and 23* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 May 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Election/Restrictions*

1. Claims 5-11, 13, 14, 17-21 and 24-59 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a non-elected species, there being no allowable generic or linking claim. Election was made without traverse in the reply filed on 30 November 2006. Further, in the Remarks of 29 January 2008, page 34 lines 2-3, Applicant states claims 5-11, 13, 14, 17-21 and 24-59 are withdrawn from consideration. Therefore, in the claims of 29 January 2008, the status identifier for each of claims 5-11, 14, 18-21 and 24-59 should be "withdrawn", per 37 CFR 1.121(c).

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 2, 60 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art ("APA") (figs. 52-54 and specification page 1, line 12 to page 7, line 6) in view of Watley et al. ("Watley") (US Patent No. 6778782).

Regarding claims 1 and 2, APA discloses a polarization mode dispersion compensation method in an optical transmission system which comprises an optical signal transmitter which sends an optical signal, an optical transmission path which is

connected to said optical signal transmitter and which transmits said optical signal, and an optical signal receiver which is connected to said optical signal transmitter via said optical transmission path and which receives said optical signal (fig. 53 and specification page 2, line 18 to page 3, line 13), comprising: sending said optical signal from said optical signal transmitter to said optical transmission path, separating from said optical signal which is propagated along said optical transmission path, the polarization component which is parallel to, and the polarization component which is perpendicular to, the principal state of polarization of said optical transmission path and compensating 1st order polarization mode dispersion (PMD) at said polarization component which has thus been separated and receiving by said optical signal receiver said optical signal which has been compensated (fig. 53 and specification page 2, line 18 to page 3, line 13). APA discloses compensating for 1st order PMD but does not disclose compensating for group velocity dispersion of either separated polarization component. Watley discloses using a chromatic dispersion compensator in series with any conventional 1st order PMD compensator (fig. 2 and col. 4 lines 44-52, col. 5 line 53 to col. 6 line 6 and col. 8 lines 55-60). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a chromatic dispersion compensator in series with the compensator of APA, to provide additional compensation of chromatic dispersion and 2nd order PMD, as suggested by Watley.

Regarding claim 60, APA discloses a polarization mode dispersion compensation method in an optical transmission system which comprises an optical signal transmitter which sends an optical signal, and optical transmission path which is connected to said

optical signal transmitter and which transmits said optical signal, and an optical signal receiver which is connected to said optical signal transmitter via said optical transmission path and which receives said optical signal (fig. 54 and specification page 4, line 1 to page 5, line 7), comprising: sending said optical signal from said optical transmitter; separating from said optical signal which is propagated along said optical transmission path, either one of or both of a polarization component parallel to the principal state of polarization of said optical transmission path and a polarization component perpendicular to the principal state of polarization of said optical transmission path; compensating 1st order PMD at said one polarization component which has thus been separated, or 1st order PMD at either one of said both polarization components which have thus been separated; and receiving by said optical signal receiver said optical signal which has been compensated (fig. 54 and specification page 4, line 1 to page 5, line 7). APA does not disclose compensating for group velocity dispersion of the separated polarization component, however, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Watley with APA as described above for claims 1 and 2.

Regarding claim 61, APA discloses in an optical transmission system which comprises an optical signal transmitter which sends an optical signal, an optical transmission path which is connected to said optical signal transmitter and which transmits said optical signal, and an optical signal receiver which is connected to said optical signal transmitter via said optical transmission path and which receives said optical signal, a polarization mode dispersion compensation device provided upon said

transmission path (fig. 54 and specification page 4, line 1 to page 5, line 7) comprising: a polarization component separation device which separates from said optical signal which is propagated along said optical transmission path, either one of or both of a polarization component parallel to the principal state of polarization of said optical transmission path and a polarization component perpendicular to the principal state of polarization of said optical transmission path; and a dispersion compensation device which compensates 1st order PMD at said one polarization component which has thus been separated by the polarization component separation device, or 1st order PMD at either one of said both polarization components which have thus been separated by the polarization component separation device (fig. 54 and specification page 4, line 1 to page 5, line 7). APA does not disclose compensating for group velocity dispersion of the separated polarization component, however, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Watley with APA as described above for claims 1 and 2.

4. Claims 3, 4 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hideaki et al. ("Hideaki") (Japanese Patent Publication No. 2000-356760) in view of Watley (US Patent No. 6778782).

Regarding claims 3 and 4, Hideaki discloses a polarization mode dispersion compensation method in an optical transmission system which comprises an optical signal transmitter which sends an optical signal, an optical transmission path which is connected to said optical signal transmitter and which transmits said optical signal, and

an optical signal receiver which is connected to said optical signal transmitter via said optical transmission path and which receives said optical signal (fig. 1 and paragraphs 0027-0030), comprising: outputting said optical signal from said optical signal transmitter (fig. 1, element 10); receiving input of said optical signal, and converting said optical signal to circular polarization or to linear polarization (fig. 1, element 12 and paragraph 0027); sending said optical signal which has been thus converted to said optical transmission path (fig. 1, element 14); a PMD medium which is connected to said optical transmission path is provided in advance at the signal reception side of said optical transmission path, separating the polarization components which is parallel to, or the polarization component which is perpendicular to the PSP of said optical transmission path (fig. 1, element 16) and said PMD medium are made so that the PSP of said optical transmission path and said PMD medium are linearly polarized or circularly polarized (fig. 1, elements 12 and 14 and paragraph 0027); compensating 1$^{st}$ order PMD at said polarization component which has thus been separated (fig. 1, elements 16, 22, 24, 26 and 28 and paragraphs 0028-0030); and receiving by said optical signal receiver said optical signal which has been compensated (fig. 1, element 20 and paragraph 0029). Hideaki discloses compensating for 1$^{st}$ order PMD but does not disclose compensating for group velocity dispersion of either separated polarization component. Watley discloses using a chromatic dispersion compensator in series with any conventional 1$^{st}$ order PMD compensator (fig. 2 and col. 4 lines 44-52, col. 5 line 53 to col. 6 line 6 and col. 8 lines 55-60). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a chromatic dispersion compensator in

series with the compensator of Hideaki, to provide additional compensation of chromatic dispersion and 2nd order PMD, as suggested by Watley.

Regarding claim 12, Hideaki discloses in an optical transmission system which comprises an optical signal transmitter which sends an optical signal, an optical transmission path which is connected to said optical signal transmitter and which transmits said optical signal, and an optical signal receiver which is connected to said optical signal transmitter via said optical transmission path and which receives said optical signal, a polarization mode dispersion compensation device, provided upon said transmission path (fig. 1 and paragraphs 0027-0030), and comprising: a polarization controller which converts the polarization state of the optical signal which has been outputted from said optical signal transmitter (fig. 1, element 12 and paragraph 0027); a polarizer which separates out a specified polarization component from the optical signal which is outputted from said polarization controller (fig. 1, element 16 and paragraph 0028); a waveform deterioration detector which detects waveform deterioration of the polarization component which has been separated out by said polarizer (fig. 1, element 24, 26 and 28 and paragraph 0029); a control device which controls said polarization controller so that the waveform deterioration which is detected by said waveform deterioration detector becomes a minimum (fig. 1, element 28 and paragraph 0029) and an automatic dispersion compensator which compensates 1st order PMD of the polarization component which has been separated out by said polarizer (fig. 1 and paragraph 0030). Hideaki does not disclose compensating for group velocity dispersion of the separated polarization component, however, it would have been obvious to one of

ordinary skill in the art at the time of the invention to combine Watley with Hideaki as described above for claims 3 and 4.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hideaki (Japanese Patent Publication No. 2000-356760) in view of Watley (US Patent No. 6778782), as applicable for claims 3, 4 and 12 above, and further in view of Penninckx et al. ("Penninckx") (US Patent Application Publication No. 2002/0003916).

Regarding claim 15, Hideaki discloses in an optical transmission system which comprises an optical signal transmitter which sends an optical signal, an optical transmission path which is connected to said optical signal transmitter and which transmits said optical signal, and an optical signal receiver which is connected to said optical signal transmitter via said optical transmission path and which receives said optical signal, a polarization mode dispersion compensation device, provided upon said transmission path (fig. 1 and paragraphs 0027-0030), and comprising: a polarization controller which converts the polarization state of the optical signal which has been outputted from said optical signal transmitter (fig. 1, element 12 and paragraph 0027); a polarizer which separates out a specified polarization component from the optical signal

which is outputted from said DGD element (fig. 1, element 16 and paragraph 0028); a waveform deterioration detector which detects waveform deterioration of the polarization component which has been separated out by said polarizer (fig. 1, element 24, 26 and 28 and paragraph 0029); a control device which controls said polarization controller so that the waveform deterioration which is detected by said waveform deterioration detector becomes a minimum (fig. 1, element 28 and paragraph 0029); and an automatic dispersion compensator which compensates 1st order PMD of the polarization component which has been separated out by said polarizer (fig. 1 and paragraph 0030). Hideaki discloses compensating for 1st order PMD but does not disclose compensating for group velocity dispersion of the separated polarization component. Watley discloses using a chromatic dispersion compensator in series with any conventional 1st order PMD compensator (fig. 2 and col. 4 lines 44-52, col. 5 line 53 to col. 6 line 6 and col. 8 lines 55-60). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a chromatic dispersion compensator in series with the compensator of Hideaki, to provide additional compensation of chromatic dispersion and 2nd order PMD, as suggested by Watley. Also, Hideaki does not disclose a Differential Group Delay (DGD) element which allocates a PMD to the optical signal which is outputted from said polarization controller. Penninckx teaches a PMD compensator where a DGD generator is used after a polarization controller (fig. 1 and paragraph 0018). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a DGD generator after the polarization controller of Hideaki to provide the benefit of compensating differential delay, as taught by Penninckx.

Regarding claim 16, the combination of Hideaki, Watley and Penninckx discloses a polarization mode dispersion compensation device according to claim 15, further comprising a polarization setting device that sets the polarization state of the optical signal which is outputted from said optical signal transmitter to circular polarization or to linear polarization (Hideaki: fig. 1, element 12 and paragraph 0027).

***Allowable Subject Matter***

7. Claims 22 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

8. Applicant's arguments filed 29 January 2008 have been fully considered but they are not persuasive.

In the Remarks page 34 line 6 to page 36 line 17, the Applicant first summarizes existing features of the claims, and then on page 36 lines 18-23, the Applicant argues that Watley does not disclose or suggest separating polarization components of the PSP, and thus cannot compensate for high order PMD components. First, the Applicant does not actually claim separating polarization components *of the* PSP, the Applicant claims separating polarization components that are *parallel to* or *perpendicular to* the PSP. Second, APA already discloses a 1$^{st}$ order PMD compensator that separates polarization components that are parallel to or perpendicular to the PSP. Further,

regardless of the fact that Watley does indeed disclose separating polarization components that are parallel to or perpendicular to the PSP (see e.g. Watley col. 4 line 53 to col. 5 line 40), the pertinent role of Watley in the combination is to use a chromatic dispersion compensator in series *with any conventional 1st order PMD compensator* (i.e. the one already provided by APA), to provide additional chromatic dispersion and 2nd order PMD compensation. The Applicant's assertion that Watley cannot possibly compensate for higher order PMD components is incorrect, because the purpose of Watley's additional compensation is to achieve that very result.

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

***Conclusion***

10. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pairdirect.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/N. M. C./

Examiner, Art Unit 2613

/Jason Chan/

Supervisory Patent Examiner, Art Unit 2613